CCC INDUCED CHANGES IN *RAUVOLFIA SERPENTINA*

It has now been recognized that (2-chloroethyl) trimethylammonium chloride (CCC) is one of the unique chemicals for the regulation of plant growth and development. It greatly retards the growth of plants under natural conditions (Cathey, 1960, 1964; Cathey and Stuart, 1961; Chakraverty, 1969). This approach of plant growth is relatively recent and the results so far obtained seem to have considerable bearing on crop production (Appleby *et al.*, 1966; Humphries, 1968; Humphries *et al.*, 1965; Larter, 1967; Linser and Kuhn, 1963). The chemical has also been tested on a number of medicinal plants and with spectacular effects on the production of therapeutically active constituents (Andries and Lamba, 1967; Bennett and Sciuchetti, 1964; Lamba and Andries, 1966; Sciuchetti and Born, 1965; Sciuchetti *et al.*, 1965). But no attempt has yet been made on *Rauvolfia serpentina* (Linn.) Benth. ex Kurz, a plant reputed for its alkaloids specific for hypnotic, sedative, astringent and hypotensive properties as well as having considerable export potentialities. It was, therefore, deemed as of interest to test the efficacy of CCC on the changes in growth, root development and alkaloid production in *R. serpentina.*

Viable and healthy seeds of *R. serpentina,* obtained from Directorate of Cinchona and Other Medicinal Plants, Govt. of West Bengal were decontaminated with 0.1 per cent mercuric chloride and were sown in seed beds. The germinated seedlings were transplanted in earthenware pots (35 cm diameter) containing a mixture of garden soil and farmyard manure in the ratio of 3:1. Freshly prepared aqueous solutions of CCC in the concentrations of 0 (distilled water which served as the control), 10, 100 and 1000 mg/1 were applied to the foliar parts of the plants with 0.1 per cent Tween 80 as a wetting agent. Spraying operations were made by means of a compressed air sprayer preferably in the afternoon. Eighty pots each containing a single plant were kept for each treatment, of which experimental observations were made from 20 pots following the usual statistical procedure (Snedecor, 1957). Samples for root growth and chemical analysis at regular intervals were collected from the rest of the plants. Applications of CCC were made at monthly intervals, starting from 2 months old seedlings and continued for next 12 months. Observations were made on the growth of the shoot and root, fresh and dry weight changes and changes in the total alkaloid and reserpine contents of roots. The alkaloids were estimated following the techniques of Hochstein *et al.* (1955) and Neuss *et al.* (1953).

The results are presented in Table I. CCC was found to inhibit the growth of plants and the length of the main root particularly at 1000 mg/1 concentration. With lower concentrations the inhibition was not marked. The effects became prominent after 5-6 applications and maintained up to the final harvesting stage. At 10 and 100 mg/1 the diameter of the root was slightly reduced but at 1000 mg/1 CCC it was significantly greater over the untreated controls. The treated plants were much healthier with dark green foliage. CCC was found not to alter the flowering and fruiting behaviour of plants. An increased trend in the fresh and dry weights of roots were recorded in plants treated with CCC. Inconsistent variations were, however, recorded in some cases. The total alkaloid as well as the reserpine contents of the root were increased by CCC treatments.

From the present investigation it appears that CCC can profitably be used to alter the growth pattern of *R. serpentina* with the object of increasing the yield of therapeutically active principles.

Table I. *Effects of CCC on the final height of plants, root growth and alkaloid contents of R. serpentina. Average of* 20 *replications per treatment (expressed as per cent control)*

Treatments (mg/l)	Plant height	Root growth and development				Alkaloid contents (Per cent dry weight)	
		Length	Diameter	Fresh wt.	Dry wt.	Total	Reserpine
0 (control)	100.00	100.00	100.00	100.00	100.00	100.00	100.00
10	92.80	95.40	96.10	101.50	126.20	105.00	105.90
100	96.68	92.70	92.90	108.18	90.89	99.40	99.50
1000	83.97	77.00	132.00	118.55	104.66	118.53	111.77

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